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THE EFFECT OF FISHERIES PRODUCTIVITY, SOCIOECONOMIC FACTOR, NON-FISHERIES BUSINESS OPPORTUNITY ON VULNERABILITY AND POVERTY: SMALL-SCALE FISHERIES IN RIAU ISLANDS, INDONESIA

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ABSTRACT

***Purpose**:* to prove and analyze the effect of fisheries productivity, social economic factors, and non-fisheries business opportunity on vulnerability and poverty of small-scale fisheries in Lingga Regency, Riau Islands, Indonesia..

Design/methodology/approach: the research was conducted by applying direct interviews with small-scale fisherman households. The study population was 937 low households in the fisheries sector, where the study sample was 168 low households. This study uses a survey method. The data analysis technique used in this research is Structural Equation Modeling (SEM).

Findings: the results showed that fisheries productivity had a significant and negative effect on vulnerability. However, the socioeconomic factor and non-fisheries business opportunities had a significant and positive effect on vulnerability. The research results also showed that fisheries productivity has a positive and insignificant effect on poverty, socioeconomic factors have a positive and significant effect on poverty, and non-fisheries business opportunities have a significant and negative effect on poverty. Meanwhile, the vulnerability has a significant and positive effect on poverty.

Research limitations/implications: the limitations of the research carried out in this study are that the author has not been able to reach all fishermen who are scattered on isolated islands in Lingga Regency, Riau Islands Province. The geographic conditions of the archipelago in the form of remote areas are relatively difficult for the author to reach.

Practical implications: several things that suggest to the Government of Indonesia for both central and local governments in the fisheries sector are as follows: 1) provide benefits in the long and short term by implementing sustainable strategies to increase fishermen's productivity; this is because increased fish productivity can reduce poverty fisherman household. 2) increasing knowledge of human resources, which will directly impact the use of technology in the fisheries sector, which can accelerate the increase in productivity. 3) improvement of economic infrastructure and financial services to reduce socioeconomic factors, which positively and significantly impact poverty for small-scale fishers. 4) providing education and training for non-fishery alternative micro-businesses to diversify fishermen's household income.

Originality/value: This paper is original.

Paper type: Research paper

Keyword: Productivity, Socioeconomic Burdens, Non-Fisheries Business Opportunity, Vulnerability, And Poverty

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I. INTRODUCTION

Based on the World Bank Report entitled "fish to 2030 Prospects for Fisheries and Aquaculture", fishery commodities are large-scale traded in international markets (World Bank, 2013). Indonesia is one archipelago country with 3,257,483 km2 of water areas and abundant fishery resources. Total fisheries production of Indonesia in 2015 reached 22,31 million tons (MT), which is evaluating at $18.1 billion (Ariansyach, 2017). Production of marine capture fisheries in 2015 was 6,2 million MT, which is evaluating at around $5 billions (Ariansyach, 2017). This report shows that fisheries' income could spread the wealth among society and reduce poverty in a developing country, especially Indonesia.

Ironically, many fishers in Indonesia are still in small scale fisheries, and they catch fish only to fulfill their daily needs. The highest poverty score is giving to fisheries households in Riau province, especially the Lingga regency. Lingga Regency in Riau Island Indonesia is one of the regencies representing small-scale fisheries in Indonesia with 28,82 % household work as fishermen. Poverty in Lingga regency is showing by housing conditions in vulnerable houses; 83% of households living in a house with a low-quality wood wall. The poverty threshold on Lingga regency in 2015 only reach Rp 354,916 ($ 26,3) per capita, with the headcount index in poverty reach 14.95% (BPS, 2018).

Furthermore, the poverty gap reaches 2,07 and poverty severity each 0,44, which is means poverty depth and inequality in Lingga is relatively high. Low households allocate less income to necessities that are important for health, such as rice, vegetable, and meat, and cannot afford higher education services (Rasyid, Kristina, Sutikno, Sunaryati, & Yuliani, 2020). These data indicate that fishers in Lingga are trapped in poverty conditions and have less probability of breaking the poverty circle.

Based on these data, it can see that the high growth of the fish commodity market, which is high both globally and nationally, is not matched by an increase in the welfare of fishers in the Lingga Regency. Islam (2011) argues that fishers who cannot afford to be free from the cycle of poverty are fishermen who are vulnerable to the risk of crises that can occur such as bad weather, natural disasters, fuel increases, and fish selling prices fall (Mohammad Mahmudul Islam, 2011). The vulnerability of people who work as fishermen is relatively high due to their dependence on climate change and economic conditions related to fish and fuel (Mohammad Mahmudul Islam, 2011). Md. Monirul Islam, Sallu, Hubacek, & Paavola (2014) describe vulnerability to fisheries-based livelihoods as the degree to which fisheries-based livelihood systems cannot cope with the adverse effects of climate and economic change, including climate variability and the selling price of fish. Therefore, this study predicts the vulnerability of fishers to affect fishermen's poverty.

Several economic kinds of literature explain several determinants that can affect the vulnerability and poverty of fishers, one of which is the productivity of fishermen's fish catch. Mohammad Mahmudul Islam (2011) explains that fishermen's low fish catch causes the fishermen's only income to below, and even they can suffer losses if the catch is less than the operational costs incurred by the fishermen. Low daily income or losses experienced by fishermen make fishers more vulnerable to life and the risk of an economic crisis and trap fishers into a prolonged poverty cycle (Mohammad Mahmudul Islam, 2011). Walden, Fissel, Squires, & Vestergaard (2015) states that fishing activities, in particular, have a direct impact on fish productivity because the depletion of fish catches can result in decreased productivity. After all, fishers have a lower output with the same input; this decrease in productivity causes fishermen's profits to be lower so that fishers more vulnerable to poor economic or natural conditions and trapped in a cycle of poverty. Therefore, in this study, it is predicted that fishers' productivity will affect their vulnerability and poverty.

In addition to the productivity of fishermen's activities, social and economic factors can significantly affect fishermen's poverty. Mohammad Mahmudul Islam (2011) explains that there are limited financial assets owned by fishermen such as boats, nets, the dominance of intermediaries supply power in the fish market, ship fuel prices, uncertain income, lack of savings, lack of infrastructure to sell directly, and the low quality of health they have. Fishers make fishers more vulnerable to the risk of a crisis, both economic and bad natural conditions. Fishers who have entered old age often lack family support to help them look for fish, limited assets also cause fishers to rent boats and their equipment, the low price power of the fish market causes the selling price of fish to be unable to provide profits to meet fishermen's other needs (Mohammad Mahmudul Islam, 2011). The low access to financial services to save as financial security when fishers experience poor fishing results causes fishers to be unable to catch fish in the next period (Mohammad Mahmudul Islam, 2011).

On the other hand, providing easy access to financial services to some low households could lift them out of poverty, where households get a supply of loans at lower costs to increase their operational productivity (Ouechtati, 2020). In Southeast Asian countries, including Indonesia, providing financial services to remote villages and the convenience of savings and loan services can increase the income of the poor in the regions, thereby reducing national inequality (Syadullah, Adriansyah, & Wibowo, 2019). Therefore, it is predicting that economic and social factors affect the vulnerability and poverty of fishers.

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To reduce fishermen's vulnerability, business diversification needs to be carried out by low-income households. Mohammad Mahmudul Islam (2011) explains that fishermen's other alternative income, such as agriculture, handicrafts, and financial investment, can increase fishermen's resilience to the risk of lousy fishing and economic crises. When fishers experience fishing losses, the income from other businesses can meet the basic needs of their household and use it for working capital in fishing (Mohammad Mahmudul Islam, 2011).

If the alternative business opportunities carried out by family members (wife, children) are higher than fishing activities, then the household has a high potential to be free from the cycle of poverty (Mohammad Mahmudul Islam, 2011). Therefore, in this study, it is predicted that non-fishery business opportunities can affect fishers' vulnerability and poverty.

Based on the background of the problem and the previous literature, this study aims to examine the effect of capture fisheries productivity, socioeconomic factors, and non-fisherman business opportunities, which are estimated to impact the vulnerability and poverty of fishermen households.

II. LITERATURE REVIEW

A. Fisheries Productivity

Increasing the company's productivity can increase the standard of living of stakeholders. If labor, capital, etcetera can produce more and more quality, it can produce higher company income so that the welfare of owners, workers, and lenders can increase (Brzustowski, 2008). Productivity was initially defined by Brzustowski (2008) as what a person can produce by using the materials, capital, and technology they have. In its development, Bernolak (1997) explained that high productivity results in more output and quality and uses fewer materials, labor, and technology with the same results. Brzustowski (2008) defines operational productivity as a function where labor and capital together produce economic output. In the context of labor, labor productivity is measuring as the value generated for each hour worked. This measure of labor productivity illustrates the correlation between real outcome and labor usage in the production process. The resulting measure also shows changes in the number of goods and services over time. Although a measure of productivity links to the working hours of all people involved in a sector, it does not measure agrregately labor, capital, or other factors of production contribution. However, these measures reflect the co-effects of many influences, including technological change, capital investment, output level, utilization of capacity, material, energy, organization production, managerial skills and business work effort. Thus, it can see that productivity is the ratio between the output produced and the labor and capital inputs used.

Walden et al. (2015) state that productivity in the fisheries sector consists of intrinsic factors such as repair of fishing equipment, technical changes in information comunication technology and engine power, and extrinsic factors such as conditions of regulator, fuel prices, and stocks. In this study, fishermen's productivity is defined as the ratio between the amount of collected fish and the amount of used input to harvest fish. Thus, the change in productivity can measure the ratio of the change in collected output (fish) to the change in the used input to achieve that output.

B. Socioeconomic Burden

Socioeconomic burdens are burdens seen from a socioeconomic perspective. When viewed from a fisheries perspective, Macusi, Katikiro, & Babaran (2017) stated that there are 14 identified socioeconomic factors that can contribute to fishermen's decision to survive or leave capture fisheries, namely: market access, access of financial service, fishermen's wealth based on household equipment, ship technology, catch a price, number of households. Members, alternative livelihoods, years of fishing, fishermen's age, years of education, catch fuel costs, the proportion of catch sold, and the fishing days number per month. Meanwhile, Yunita, Pargito, & Sinaga (2018) suggest that there are two main aspects of fishing communities, namely social and economic aspects:

a. Social Aspects: education level, human resources, access to health
b. Economic Aspect: capital. fishing equipment, technology, fishermen's income, fishermen's lifestyle, bargaining power at market, financial acces.

Ahmad & Khan (2018) argue that reducing human capital such as education level and health condition can affect economic growth and reduce poverty in developing country. Furthermore, economic aspect such as liberalized market, foreign direct investment and equality can affect economic growth (Farooq, Chaudhry, Khalid, & Tariq, 2019). Mohammad Mahmudul Islam (2011) argue that financial service access to food producer can affect food production and national food security, thus reducing poverty developing country. So that, this research predict socioeconomic burdens affect fishermen’s vulnerability and poverty.

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C. Non-Fisheries Business Opportunity

Business opportunity theory emphasizes the dynamics of strategic actions and results in the business sector (Muhammad, Islamy, & Suharsono, 2014). In the scope of fisheries, alternative livelihoods, or business opportunities for non-fishermen need to be improved so that fishers' productivity who catch fish becomes more efficient (Muhammad et al., 2014). When fishers began to start non-fisherman business activities, the income of fishermen increase then they can allocate alternative income to improve saving and alleviate poverty (Mohammad Mahmudul Islam, 2011).

Fishermen household investment in non-fisheries business opportunity can be defined as diversification activities that produce alternative income from non-fisheries activity (Mohammad Mahmudul Islam, 2011). Torell, McNally, Crawford, & Majubwa (2017) argue that diversification on alternatives activities can incerase generating income especially poor household and is adopted to reduce poor household's vulnerability to risk and provide solution for releasing form poverty circle. So that, this research predict non-fisheries business opportunity which is taken as diversification activites for generating income affect fishermen's vulnerability and poverty.

D. Vulnerability

Alexandratos & Bruinsma (2012) states that vulnerability is a function of the risk of people who may be exposed (risk exposure); sensitivity of their livelihoods to risk (sensitivity); and the ability to adapt, cope with changes or recover from the effects of external shocks (adaptive capacity). In fisheries context, fishermen's change sensitivity and associated risks depend not only on socio-economic factors such as debt level and dependence on working capital with limited control and the fish selling price, but also on fisheries productivity (Md. Monirul Islam et al., 2014). Likewise, with adaptive capacity, fishers' adaptive capacity depends on their capability to tolerate or avoid risks (for example, withdrawing assets such as savings for health and education or other activities). Béné & Friend (2011) argue that fishermen's exposure to risk and sensitivity to risk is relatively high compared to other socioeconomic groups, and fishermen's adaptive capacity is quiet low; fishermen may be exposed to physical risks such as depending on the nature condition of the fishery activities and fish collected result, and the socioeconomic context. for example, risks caused by climate (sea level rise, impacts of flooding or storms) tropical); fluctuations caused by climate change in fish stocks, health risks, market risks (currency devaluation, fuel price increases), security risks (theft, piracy or regional conflict), and so on.

The three vulnerability elements (exposure to risk, sensitivity, and adaptability) are, of course, linked to other dimensions of poverty. People living below poverty threshold are often to live in areas where they are vulnerable to health risks due to bad sanitary conditions; furthermore, if their food quality is low, they will get some infection and more sensitive to dissease than well-nourished people; and if they vulnerable to this risk, they cannot go to work and generate income for their family, then they will be trapped in poverty circle (Torell et al., 2017). Mohammad Mahmudul Islam (2011) argue that vulnerable fishermen to financial risk such as (dropping fish price, increasing fuel price) and natural risk (bad climate and poor fish collecting result) cannot afford another sailing activities in next season or education service to generate income and trapped in poverty circle. So that, this research predict fishermen's vulnerability affect fishermen's poverty.

E. Poverty

According to Walden et al. (2015), poverty is defining as a "deficiency in welfare." This view includes the conventional view that links welfare to commodity control. The poor do not have sufficient income or consumption to place them above a sufficient minimum threshold. This view looks at poverty from a monetary perspective. Poverty itself is measuring through welfare indicators such as income or per capita consumption. Income, which is defining in principle as the change in consumption and change in net worth, is generally used as a measure of welfare in developed countries but tends to be lower in developing countries. Although consumption tends to underestimate, it can use as an approach to measuring income. Per capita consumption is the most commonly used measure of welfare; some analysts use consumption per adult to capture differences in needs by age and economies of scale in consumption.

F. Conceptual Framework

The conceptual framework of this study is describing as follows:

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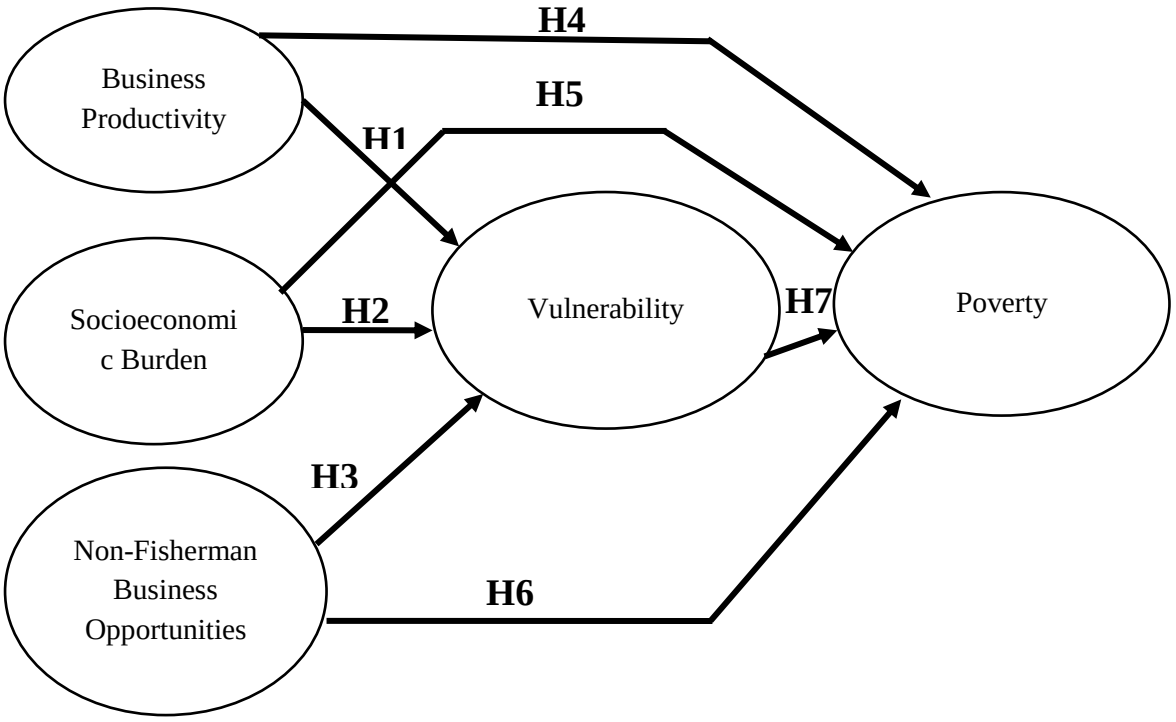

Figure 1. Conceptual Framework

Based on this conceptual framework, the hypotheses proposed in this study are as follows:
H1. Business Productivitysignificant effect onvulnerability.
H2. Business Productivitysignificant effect onpoverty.
H3. Socio-Economic Burdensignificant effect onvulnerability.
H4. Socio-Economic Burdensignificant effect onpoverty.
H5. Non-Fisherman Business Opportunitiessignificant effect onvulnerability.
H6. Non-Fisherman Business Opportunitiessignificant effect onpoverty.
H7. Vulnerabilitysignificant effect onpoverty.

III. METHODOLOGY

A. Data

In this study, the population used to determine the number of research samples is all low small fishermen households in Lingga Regency, Riau Islands Province. Small-scale fishing households have their main livelihood as fishers to fulfill their daily needs by using fishing boats with a maximum of 5 Gross Tons (GT).

Using the population of small and poor fishermen households as much as 937 households and taking into account the coverage area in Lingga Regency, an archipelago area, we surveyed 168 households to collect information. Household sampling is basing on a purposive sampling design. The household survey targets the head of the household. Determination of the sample of low small fisherman households is carrying by referring to the Yamane formula.

B. Measurement

In this study, each variable is measure using indicators adopted from previous studies and adapted to the research context. To measure business productivity, this study uses indicators of natural resource potential, fish production (Walden et al., 2015), use of modern technology, climate, inputs used to produce (capital, labor, government subsidies, etcetera.). This study uses the number of household members, social activities (donation culture, social gathering, etcetera.), consumptive lifestyle, does not have a stable income, and dependence on loan funds on intermediaries (Macusi et al., 2017). To measure business opportunities for non-fishermen, we use indicators of skills and knowledge outside capture fisheries, availability of alternative business activities other than fisheries, interest in other alternative activities, and accessibility to carry out other activities (Lado, 2011).To measure vulnerability, this study uses Indicator 1) exposure selected for this region characterizing the

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frequency of extreme events, rates of soil erosion and sea-level rise, and variations in temperature and rainfall; 2) sensitivity includes livelihood characteristics such as livelihood dependence on climate-sensitive activities and resource use patterns; 3) adaptive capacity that covers a wide range of livelihood characteristics such as assets and livelihood strategies, assuming that households and communities with more than this are better able to cope with and adapt to the impacts of climate variability and change. To measure poverty, this study uses four dimensions identified in the OPHI (2020) consisting of Living Standards; Health (Health): Education; and Employment.

C. Data Analysis

The data analysis technique used in this research is structural equation modeling (SEM) with IBM SPSS-AMOS version 22 software. Hair et al. (2013) explain that in SEM modeling, the following steps are necessary:

1. Development of a theory-based model
2. Development of path diagrams to show causality relationships
3. Structural equations and measurement model specifications
4. Selection of the matrix and estimation techniques for the model being build
5. Identify the problem
6. Evaluation model Interpretation and model modification.

IV. DATA ANALYSIS

A. Measurement Model Analysis

The results of the Confirmatory Factor Analysis (CFA) test on exogenous and endogenous constructs consisting of business productivity, socioeconomic load, non-fishermen business opportunities, vulnerability, and poverty variables indicate that all indicators have a factor loading value greater than 0.50 so that These indicators are valid in reflecting the construct and can use for further analysis. A GFI value of more than 0.90 indicates that the exogenous constructs and endogenous constructs are compatible with the data. The CFA test results also show that the constructs of business productivity, socioeconomic load, non-fisherman business opportunities, vulnerability, and poverty all have construct reliability values greater than 0.70, so it can be concluding that these variables are reliable or reliable. In developing the model developed in this study.

B. Structural Equation Modelling (SEM) Analysis

The results of the structural model estimation analysis are presented in Figure 2 below:

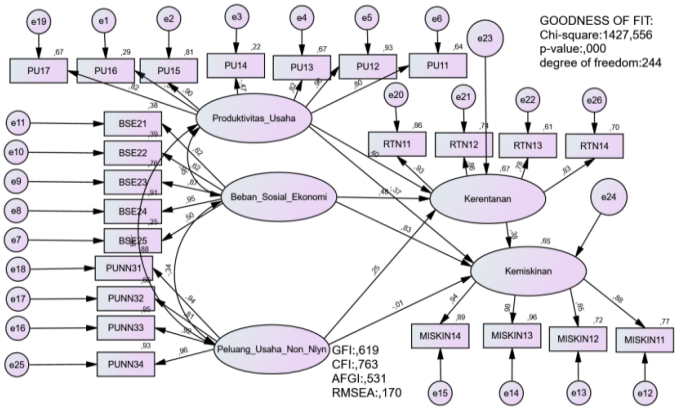

Figure 2. Full Structural Equation Model

Assuming a normal distribution of the observed variables, it knows that each covariance is statistically significant. However, the calculation results show several criteria for the goodness of fit of the model that have not provided an index by recommendations (not fit); therefore, modifying the model is necessary. Model modification in SEM is complete with the help of a modification index issued by the IBM SPSS AMOS software and adjusted to the supporting theories. The results of the SEM model modification are presented in Figure 3 below:

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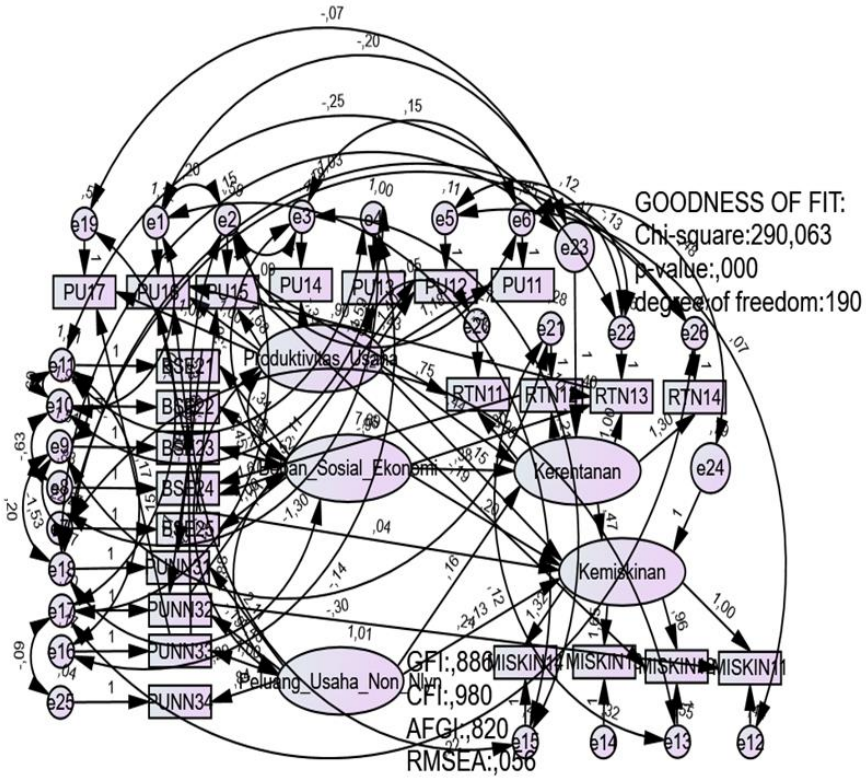

Figure 2. Modified Structural Equation Model

The results of calculating the value of the goodness of fit index generated by the modified model are as follows:

Table1. The Result Goodness of Fit dan Cut off Value Structural Model

Criteria	ModelTest Results	Critical Value	Information
Cmin/DF (Normed Chi-Square)	1,527	$\leq 2,00$ or 2,00-3,00	Good Fit
RMSEA	0,056	$\leq 0,08$	Good Fit
GFI	0,89	$\geq 0,90$	Marginal Fit
AGFI	0,82	$\geq 0,90$	Marginal Fit
TLI	0,97	$\geq 0,90$	Good Fit
CFI	0,98	$\geq 0,90$	Good Fit

The model modification result shows that Fit value's goodness has provided a better suitability model than the original data. Since we have obtained the final model, it is possible to interpret the model's parameter estimates.

C. Hypothesis Test

Here is the Regression Weight of the structural equation model:

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Table 2.Test of Causality Regression Weight

Hip.	Causality Relationship	Std Estimate	CR	p-value	Information
H1	Business Productivity →Vulnerability	-0,532	-2,699	0,007***	Significant
H2	Socioeconomic Burden→Vulnerability	1,339	5,087	0,000***	Significant
H3	Non-Fisherman Business Opportunities →Vulnerability of Non Fisherman	0,199	3,040	0,002***	Significant
H4	Business Productivity →Poverty	0,097	0,664	0,507	Not Significant
H5	Socioeconomic Burden →Poverty	0,372	2,089	0,037**	Significant
H6	Non-Fisherman Business Opportunities →Poverty	-0,087	-1,778	0,075*	Significant
H7	Vulnerability→Poverty	0,251	3,089	0,002***	Significant

* Significant at the level10%; ** Significant at the level5%; *** Significant at the level1%

Table 2 shows that vulnerability has a significant positive effect on fishermen's poverty. Thus, it can see that reducing poverty in Lingga Regency can be done by reducing vulnerability. Therefore, it is essential to pay attention to vulnerability's critical factors, namely, exposure to risk, sensitivity, and adaptive capacity.

Fishermen's productivity in fishing does not significantly affect reducing or increasing fishermen's poverty but through the mediation of vulnerability. Thus, it can see that increasing fishermen's productivity does not directly reduce poverty in Lingga Regency but reduces fishermen's vulnerability to risks and crises that can occur.

On the other hand, we can see that the socioeconomic burden also significantly reduces poverty both directly and through vulnerability mediation so that vulnerability mediates partially (partial mediation). The impact of socioeconomic burdens on poverty. Thus, it can conclude that reducing poverty in Lingga Regency can be done by reducing the socioeconomic burden.

Besides, it also knows that non-fishermen business opportunities also can directly alleviate poverty. Non-fishermen business opportunities can provide additional household income for fishers to meet basic needs so that fishers can gradually be feeding on the cycle of poverty. If observed through vulnerability mediation, non-fishermen business opportunities have a positive relationship with vulnerability. It shows that fishermen's high non-fishery opportunities further increase the vulnerability of fishers to the risks that occur. It shows that non-fishing opportunities increase the risk borne by fishermen. Thus, it can conclude that poverty alleviation in Lingga Regency can be done by directly increasing non-fishermen business opportunities. However, the increase in business opportunities can increase fishers' vulnerability due to the increased business risk that fishers will bear when running non-fishery business opportunities.

V. DISCUSSION AND RECOMMENDATION

A. Effect of Productivity on Vulnerability and Poverty

This study's results are in line with the results of research conducted by Mohammad Mahmudul Islam (2011), which states that technological changes can lead to increased productivity of both labor and capital. One of the causes of low fish productivity is the number of fishermen who are not matched by the number of catches so that the income of small-scale fishers is getting lower. Small-scale fishers will experience lower-income and difficulty getting fish, which in the end, small-scale fishers become more vulnerable because of the higher risk (Yunita et al., 2018). Ferrol-Schulte, Gorris, Baitoningsih, Adhuri, & Ferse (2015), in his research, states that people's dependence on the fishing sector is vulnerable to sudden shocks and long-term changes.

To realize good business productivity, small fishers expect to increase their knowledge further to produce quality humans with good work skills and abilities and pay attention to any modern technology that exists

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appropriately and optimally. Apart from that, the government's support to increase productivity is also essential, such as subsidizing fuel for ships and collecting fish.

The results of the analysis show that business productivity has no significant effect and harms poverty. It means that the greater the productivity of fishermen's business, the more poverty occurs in small fishers. The results of this study contradict the general theory that business productivity can reduce poverty. However, in the context of this study, the results obtained are not significant. It is because efforts to increase business productivity are long-term. Brzustowski (2008) stated that there are 2 (two) business strategies to increase productivity: increasing production volume and increasing the added value to the products sold. Efforts to increase fishery production can also make by increasing the skills and knowledge of fishers.

Meanwhile, increasing added value is a long-term strategy because it involves developing new skills and involving new ventures. In the long term, increasing the added value of the products sold is a better business strategy for companies engaged in the commodity business in all sectors. It simultaneously increases the productivity of the entire economy. The best way to increase productivity is to hire more workers in value-added production. It is a long-term strategy that requires market intelligence, new knowledge, skills, and technologies. Seeing the fulfillment of small fishers' needs in Lingga Regency, it can see that the fishing facilities owned by these small fishermen make it impossible for them to catch fish in the middle of the sea. In general, small fishers use small boats and without technology. Provision of enormous ship capital assistance or increased resources through formal education and special education in fisheries has not been able to help these small fishermen leave the Ministry in the short term. However, of course, this can have a positive impact in the long run.

B. The Influence of Socioeconomic Burden on Vulnerability and Poverty

The effect test results with SEM show that the socioeconomic burden has a significant and positive effect on the vulnerability of small-scale fishers in Lingga Regency, Riau Islands. It shows that the reduction in the socioeconomic burden of small-scale fishers will impact decreasing the vulnerability of small-scale fishing households. The socioeconomic burden includes the number of household members, social activities in the community, consumptive lifestyles, and unstable income from fishing in the sea.

Unstable incomes and tend to depend on marine products make fisher's households vulnerable to natural conditions changes and always live in shadows of uncertainty. The socioeconomic burden on fishers confirms the factors causing the vulnerability of small fishers in the Lingga Regency. It shows forcefully that the problem of socioeconomic burden must be resolved first before implementing other policies. As previously stated, the socioeconomic burden includes the number of household dependents, social activities, consumptive lifestyles, unstable income from fishing in the sea, and dependence on loans to intermediaries. This study's results support the research of Yunita et al. (2018), which explains that habits or lifestyle contribute to worsening the level of fishermen's welfare.

It is not correct to call fishers lazy because they always work hard. However, the problem is the consumptive lifestyle. When income is high, it is not saved to face hunger but is used to buy secondary necessities. The fishing community is always identifying as having the lowest level of welfare. Incomes that are unstable and tend to depend on natural resources, fishermen households always live in the shadow of poverty. Besides, usually, fishers still have low educational status and limited expertise. It allows them to improve their family's standard of living. Fishers' income from fishing will always run out, and there is no remainder because of routine expenses made by fishermen's households. The need for daily food is undoubtedly not something trivial; the need for food is the main thing that must meet, followed by the needs of school children and other social needs. To overcome unmet needs, fishermen's steps are finding sources of loans from neighbors, relatives, stall/kiosk owners, regular social gathering / cooperative managers, and intermediaries, so that is the most challenging choice is to borrow from intermediaries. These middlemen sometimes charge high rates, according to the fishermen. The goodness of intermediaries is not without interest; borrowing fishers must deposit their catch with intermediaries in addition to high loan interest. The fishing community is aware that this is detrimental to them because the sales proceeds cannot follow market prices but are determined unilaterally by the middlemen.

The socioeconomic burden of small-scale fishers requires serious attention from the government. Socioeconomic burdens such as a relatively low level of education, a fishermen's lifestyle that tends to be consumptive when getting money from fisheries, instability of income received by fishermen, limited capital, difficulties in accessing finance to official financial institutions are socioeconomic—a burden for fishers that needs to be handling.

The influence test results using SEM show that the socioeconomic burden has a significant and positive effect on the poverty of small-scale fishers in Lingga Regency, Riau Islands. It shows that the reduction in socioeconomic burdens will impact reducing the poverty of small-scale fishing households. The socioeconomic burden referred to here is household dependents, social community activities, consumptive lifestyles, unstable income, and loan dependence on intermediaries. Meanwhile, in this study, poverty is the standard of living,

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health, education, and labor. Activities or activities that aim to reduce socioeconomic burdens can impact poverty reduction that occurs in small fishers in Lingga Regency, Riau Islands. On the other hand, the greater the socioeconomic burden experienced will increase small fishers' vulnerability in Lingga Regency, Riau Islands.

Because the socioeconomic burden also can alleviate poverty both directly and indirectly through vulnerability mediation so that the vulnerability to mediate partially (partial mediation) of the impact of the socioeconomic burden on poverty, in the context of poverty alleviation in Lingga Regency, the socioeconomic burden needs to be reduced. However, if the vulnerability decreases, the impact of reducing poverty will be even more significant.

C. The Effect of Non-Fishermen's Business Opportunities on Vulnerability and Poverty

The results showed that non-fishery business opportunities had a positive and significant effect on vulnerability. It gives a contradictory meaning to the formulated hypothesis. The hope is that if the non-business opportunities increase, the vulnerability faced by small fishermen can decrease. However, research results do not say so—the availability of business opportunities for non-fishermen increases the risk borne by small fishermen. The life of those who are needy and dependent on the sea increases the risk of these small fishermen to conduct business opportunities that do not promise a substantial income. Therefore, fishers feel increasingly vulnerable if they have to switch from their current profession and invest their capital in running uncertain business opportunities.

The influence test results using SEM show that non-fishermen business opportunities have a significant and negative effect on the poverty of small-scale fishers in Lingga Regency, Riau Islands. It shows that the increase in business opportunities for non-fishermen will impact reducing poverty in small-scale fishing households. Non-fishermen business opportunities are skills and knowledge outside capture fisheries, availability of alternative business activities besides fishing, the desire to carry out alternative activities so that they are easily accessible to carry out other alternative activities. Meanwhile, in this study, poverty is the standard of living, health, education, and labor.

Activities or activities that aim to increase non-fishermen business opportunities can impact reducing the vulnerability that occurs in small fishers in Lingga Regency, Riau Islands. It is because activities outside fisheries can provide additional income for fishers to meet their basic needs so that fishers can gradually escape the cycle of poverty. This study supports the theory of strategic action dynamics, which are part of the business strategy (Walden et al., 2015). In the scope of small-scale fishers, business opportunities for non-fishermen need to be increasing so that the productivity of fishers who catch fish becomes more efficient (Muhammad et al., 2014). Non-fishermen business opportunities will, in turn, be able to alleviate poverty that occurs in small fishing households.

D. The Effect of Vulnerability on Poverty

The effect test results using SEM show that vulnerability has a significant and positive effect on the poverty of small-scale fishers in Lingga Regency, Riau Islands. The greater the poverty in small-scale fishers in Lingga Regency, Riau Islands Province, the greater the poverty that occurs in small fishers. In other words, more and more small-scale fishing households live in poverty if they become more vulnerable. The increased vulnerability can lead to increased poverty in small-scale fishing households. It is in line with what was stated by Torell et al. (2017) stated that small-scale fisheries are often determining by their relationship to poverty, marginalization, vulnerability, exclusion, exploitation, discrimination, and the impoverishment process itself. Besides, Béné & Friend (2011) also stated that the vulnerability of services in the form of risk exposure and fishermen's sensitivity to risk is relatively high compared to other socioeconomic groups. The adaptive capacity of fishers is generally low, making it difficult for fishers to escape poverty.

E. Recommendation

Thus, it can conclude that reducing poverty in Lingga Regency can be done by reducing the socioeconomic burden. The decrease in socioeconomic burden can reduce the vulnerability of fishers, and later it can impact reducing the poverty level of fishermen households. The socioeconomic burden of small-scale fishers needs serious attention from the government. Socioeconomic burdens such as a relatively low level of education, a fishermen's lifestyle that tends to be consumptive when getting money from fisheries, instability of income received by fishermen, limited capital, difficulties in accessing finance to official financial institutions are socioeconomic. A burden for fishers that needs to be handling. It is necessary to create various possible business opportunities outside the fisheries sector for small-scale fishers to cope with and adapt to future uncertainties and reduce risks. Small-scale fishers in Lingga Regency need to be introducing to business diversification to improve the fisheries sector's performance. National and regional policies need to be implementing to reduce

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vulnerability in the fisheries sector by considering three main aspects: exposure to risk, sensitivity, and adaptive capacity.

Several things that suggest to the Government of Indonesia for both central and local governments in the fisheries sector are as follows: 1) provide benefits in the long and short term by implementing sustainable strategies to increase fishermen's productivity; this is because increased fish productivity can reduce poverty fisherman household. 2) increasing knowledge of human resources, which will directly impact the use of technology in the fisheries sector, which can accelerate the increase in productivity. 3) improvement of economic infrastructure and financial services to reduce socioeconomic burdens, which positively and significantly impact poverty for small-scale fishers. 4) providing education and training for non-fishery alternative micro-businesses to diversify fishermen's household income.

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